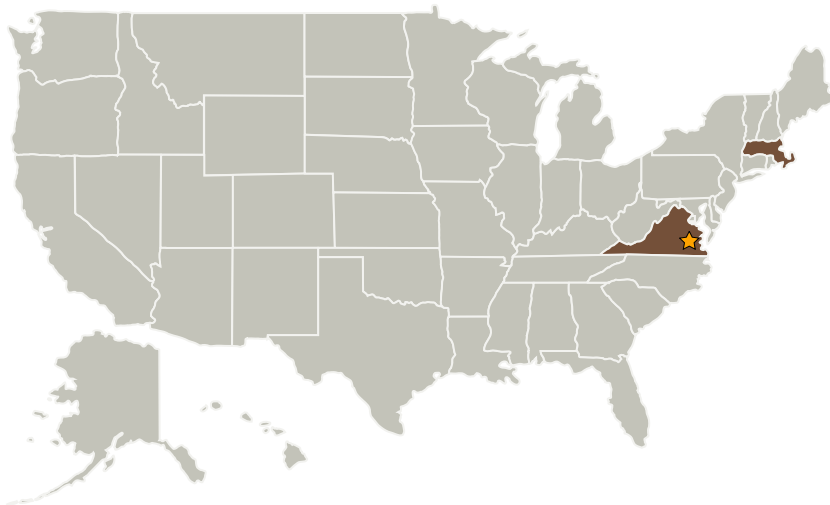## Project Introduction

SSCI proposes to further develop, implement and test the damage-adaptive control algorithms developed in Phase I within the framework of an Integrated Damage Modeling & Adaptive Control (IDMAC) system. The proposed IDMAC system design will be based on the following: (i) Development of a coupled structural and aerodynamic model of aircraft dynamics under structural damage, (ii) Generation of a set of models describing different damage cases; (iii) Model set reduction to arrive at a reduced set of control design models; and (iv) Use of the reduced model set to design multiple-model stochastic damage estimators and corresponding reconfigurable controllers to stabilize the aircraft and achieve acceptable performance of the closed-loop flight control system. The proposed IDMAC system will be tested on transport aircraft models selected in consultation with NASA Langley.

Anticipated Benefits

Potential NASA Commercial Applications: Potential non-NASA applications of the IDMAC system are in the area of commercial and military aircraft. Autonomous IDMAC will also find wide applications in other programs such as spacecraft control and Unmanned Aerial Vehicles (UAV).

Primary U.S. Work Locations and Key Partners

Integrated Damage-Adaptive Control System (IDACS), Phase II

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:
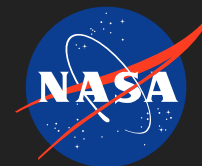
Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Organizations Performing Work	Role	Type	Location
⭐Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Scientific Systems Company, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB)	Woburn, Massachusetts

Primary U.S. Work Locations	
Massachusetts	Virginia

Project Transitions

▶ **December 2006:** Project Start

✔ **November 2008:** Closed out

   Closeout Summary: Integrated Damage-Adaptive Control System (IDACS), Phase II Project Image

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Raman Mehra

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  └ TX15.1 Aerosciences
    └ TX15.1.3 Aeroelasticity

TechPort

Printed on 12/07/2022
08:07 PM UTC

For more information and an accessible alternative, please visit:
https://techport.nasa.gov/view/5706

Page 2